AAER's
Asian College of Science and Commerce
Affiliated to SPPU and Approved by Govt of Maharashtra Accredited by NAAC with B+ Grade

Course Outcomes

The examination format consists of continuous assessment, which accountsfor30marks for internal evaluation and 70 marks for external evaluation.

Class:M.Sc. II Analytical chemistry (Sem-III and IV)

Sr. No	Subject	Course Outcome
1	Laboratory Automation and Environmental Analytical Chemistry	Instrumentation of automated laboratory analysis and sensors.
		Basic principles of automated laboratory analysis and sensors
		Importance of automated laboratory analysis and sensors.
2	Electrochemical and Thermogravimetric Methods of Chemical Analysis	Various terms in electrochemistry and thermogravimetry
		instrumentation in electrochemistry and thermogravimetry
		basic principles of electrochemistry and thermogravimetry.
		Interpret polarogram, cyclic voltammogram, pulse polarogram, thermogram, differential thermogram and DSC thermogram.
3	Analytical Method Development and Extraction Techniques	various terms in analytical extraction and method development and validation
		Develop analytical method for analysis of given sample. Apply statistical treatment to the analytical data. Select appropriate parameters for the development of analytical method
		numerical problems on analytical extraction and method development and validation.
		applications analytical extraction and method development and validation
4	Advanced Chromatographic Methods of Analysis	various terms in chromatography (GC and HPLC) and mass spectroscopy.
		instrumentations in chromatography (GC and HPLC) and mass spectroscopy
		Integrate GC and HPLC chromatogram, Mass spectrum
5	Bioanalytical Chemistry	understand various terms in Electrophoresis, capillary electrophoresis, HPTLC, Body fluid analysis, ELISA, RIA
		instrumentations in in Electrophoresis, capillary electrophoresis, HPTLC, Body fluid analysis, ELISA, RIA
		Integrate GC and HPLC chromatogram, Mass spectrum
6	Advanced Analytical Spectroscopic Techniques	understand various terms in atomic absorption, atomic emission, fluorescence, ESR and electron spectroscopy

		instrumentation of atomic absorption, atomic emission, ICPAES, ICPAES-MS, fluorescence, ESR and electron spectroscopy
		Interpret ESR spectra, super hyperfine splitting and g value in ESR, and parameters affecting it.
7	Chemical Methods of Pharmaceuticals Analysis	various terms in pharmaceutical raw material and finished product analysis
		various pharmaceutical dosage forms and types of raw materials used
		Perform and explain importance of limit tests, identification tests and micobiological limit test of raw materials and finished products

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Class:M.Sc. II Inorganic chemistry (Sem III and IV)

Sr. No	Subject	Course Outcome
1	Organometallic and Homogeneous Catalysis	Students should gain a thorough understanding of the fundamental principles underlying organometallic chemistry, including the structures, bonding, and reactivity of organometallic compounds
		Students should be able to explain the mechanisms of homogeneous catalysis, including coordination, activation of substrates, and turnover processes.
		Students should learn about the diverse applications of homogeneous catalysis in industrial processes, such as in the synthesis of pharmaceuticals, fine chemicals, and materials.
2	Inorganic Reaction Mechanism	Students should be able to classify and describe the various types of inorganic reactions, including substitution, addition, elimination, redox, and coordination reactions
		Students should develop the ability to analyze reaction mechanisms based on experimental data, kinetics, thermodynamics, and computational methods
		Students should understand the principles of coordination chemistry, including ligand-field theory, crystal field theory, and the spectroscopic properties of transition metal complexes
		Students should grasp the concepts of transition state theory and its application to inorganic reaction mechanisms, including the determination of activation energies and reaction rates
3	Bioinorganic and Medicinal Inorganic Chemistry	Students will consider the ethical, societal, and environmental implications of using metal-based compounds in medicine and biotechnology, including issues related to drug resistance, metal ion toxicity, and environmental impact
		Students will be exposed to emerging trends and applications in bioinorganic and medicinal inorganic chemistry, including the development of novel metal-based therapeutics, imaging agents, and biomaterials for regenerative medicine.
		Students will understand the factors influencing the bioavailability and toxicity of metal-based drugs, including pharmacokinetics, metal speciation, and metal ion coordination chemistry in biological fluids
		Students will explore the design and development of inorganic-based drug

		delivery systems, including nanoparticle-based drug carriers, liposomal formulations, and targeted drug delivery strategies
4	Modern Instrumental Methods in Inorganic Chemistry	Students will gain a comprehensive understanding of modern instrumental methods commonly used in inorganic chemistry, including spectroscopic, chromatographic, and electrochemical techniques
		Students will learn about the principles and applications of spectroscopic techniques such as infrared (IR) spectroscopy, UV-Visible spectroscopy, nuclear magnetic resonance (NMR) spectroscopy, and X-ray photoelectron spectroscopy (XPS) in the characterization of inorganic compounds.
		Students will be introduced to mass spectrometry techniques and their applications in the analysis of inorganic compounds, including elemental composition determination, molecular weight determination, and fragmentation analysis.
5	Heterogeneous Catalysis and its Applications	Students will gain a deep understanding of the fundamental principles underlying heterogeneous catalysis, including surface chemistry, adsorption-desorption processes, and catalytic kinetics
		Students will learn about the synthesis, characterization, and structural analysis of heterogeneous catalysts, including techniques such as X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), and surface area analysis
		Students will understand the mechanisms and reaction pathways involved in heterogeneous catalytic reactions, including key intermediates, rate-determining steps, and surface reaction kinetics
6	Inorganic Nanomaterials: Properties, Applications and Toxicity	Students will explore methods for surface functionalization and modification of inorganic nanomaterials to tailor their properties and enhance their performance in specific applications, such as improving stability, biocompatibility, and targeting capability
		Students will consider the regulatory frameworks and ethical considerations surrounding the use of inorganic nanomaterials in research, industry, and consumer products, including issues related to safety, labeling, and informed consent.
		Students will examine the potential risks associated with the use of inorganic nanomaterials, including their toxicity to living organisms and their environmental impact, and explore strategies for mitigating these risks
7	A) Material Science B) Inorganic Chemistry Applications in Industry	Students will understand the synthesis, properties, and applications of inorganic polymers, composites, and hybrid materials in industry, including their use in aerospace, automotive, construction, and packaging industries
		Students will explore the applications of inorganic compounds and materials in electronic and photonic devices, including semiconductor materials, phosphors, LEDs, solar cells, and optical fibers.
		Students will explore the applications of inorganic materials and nanotechnology in the development of advanced materials for electronics, energy storage, coatings, sensors, and biomedical devices.